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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/519,885	12/30/2004	Makoto Kato	10407-123US(A4004MT-US1)	2746

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AKIN GUMP STRAUSS HAUSER & FELD L.L.P.
ONE COMMERCE SQUARE
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PHILADELPHIA, PA 19103

EXAMINER

BROWN, HELENE C

ART UNIT PAPER NUMBER

3768

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/28/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

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Office Action Summary	Application No.	Applicant(s)	
	10/519,885	KATO ET AL.	
	Examiner	Art Unit	
	Helene Brown	3768	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 December 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 December 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☒ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>12/30/2004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Acknowledgement of Preliminary Amendments

1. For the record, acknowledgement is made of the applicant's preliminary amendments to the specification and the claims under 37 CFR 1.115. The amendments to the specifications are also acknowledged. In addition, it is acknowledged that applicant amended claims, 5-7,9, 14-16. Under examination are the original and amended claims, 1-17.

Information Disclosure Statement

2. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Specification

3. The disclosure is objected to because of the following informalities:
- a. Page 8 Line 7 – "an" should be --an--
 - b. Page 8 Line 24 – "filer" should be --filter--
 - c. Page 15 Line 3 & Page 39 Line 6 & 10 – "moduluses" should be --moduli--
 - d. Page 22 Line 12– "the" should be --The--
 - e. Page 47 Line 3 – " 10' " should be --10--

Appropriate correction is required.

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description:

- i. Reference H not disclosed in the drawings
- ii. Reference Z1, Z2, Z3, ZK ... Zn not disclosed in drawings
- iii. Specifications mentions Figure 10 Element 46 which is not in drawings
- iv. Reference 43 not disclosed in specification
- v. Reference 30, 31, 32 and 40 of Figure 10 not disclosed in specification

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claim 1-6 & 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brock-Fisher'732 et al. (US Patent No. 6,398,732 B1) and further in view of Bonnefous'028 (US Patent No. 5,411,028).

Claim 1: Brock-Fisher'732 teaches ultrasonic diagnostic apparatus (Figure 4, Element 50 & Col. 3, Line 53). Brock-Fisher'732 teaches an ultrasonic probe driving

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section for driving an ultrasonic probe for transmitting an ultrasonic transmission wave to an object to be measured including a fluid portion in which fluid moves (Figure 4, Element 55 & Col. 3, Line 53-55). Brock-Fisher'732 teaches a receiving section for amplifying (Figure 4, Element 58 & Col. 3, Line 63-65) an ultrasonic reflected wave obtained when the ultrasonic transmission wave reflects from the object to be measured and received by the ultrasonic probe (Figure 4, Element 55 & Col. 3, Line 61). Brock-Fisher'732 teaches a phase detecting section for phase-detecting the ultrasonic reflected wave (Figure 4, Element 70 & Col. 4, Line 21-26 & 38-42). Brock-Fisher'732 teaches a computing section (Figure 4, Element 64) and the phase-detected signal (Figure 4, Element 70 & Col. 4, Line 21-26 & 38-42). Brock-Fisher'732 fails to teach obtaining the velocities of the object to be measured at a plurality of measuring positions of the object to be measured and obtaining the deformation amounts and/or elastic moduli between measuring positions of the object to be measured from the velocities. However, Bonnefous'028 teaches obtaining velocities of the object to calculate deformation (Col. 1, Line 45 – Col. 2, Line 5) or elastic moduli (Col. 3, Line 47-50). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Brock-Fisher'732 and Bonnefous'028 in order to perform various calculations and realize very useful representations (Col. 2, Line 15-17). Brock-Fisher'732 teaches a fluid determining section for determining a fluid portion in the object to be measured in accordance with the phase-detected signal (Col. 4, Line 38-48). Brock-Fisher'732 teaches an image data generating section for generating image data (Figure 4, Element 59 & 61 & Col. 5, Line 13-18). Brock-Fisher'732 fails to

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teach a two-dimensionally image- displaying the deformation amounts and/or elastic moduli. However, Bonnefous'028 teaches a two-dimensionally image- displaying the deformation amounts and/or elastic moduli of the object to be measured in a region other than the fluid portion by using the information determined by the fluid determining section (Col. 4, Line 40 – Col. 5, Line 4). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Brock-Fisher'732 and Bonnefous'028 in order to produce images for examination of the patient (Col. 4, Line 52-54).

Claim 2/1: Brock-Fisher'732 teaches the fluid determining section (Col. 4, Line 38-48) but fails to teach a Doppler method. Bonnefous'028 teaches the Doppler method (Col. 8, Line 26-33). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Brock-Fisher'732 and Bonnefous'028 for the advantage of enabling broader use of the results and insensitive to the dispersion of the ultrasonic wave frequency used (Col. 8, Line 26-33).

Claim 3/2/1: Brock-Fisher'732 teaches a filter section for dividing the phase-detected signal into a frequency component higher than a predetermined value [threshold value] and a frequency component equal to or lower than the predetermined value [threshold value] and selectively inputting signals of the divided frequency components to the fluid determining section and the computing section (Figure 4, Element 64 & 70, Figure 5, Element 112 & Col. 5, Line 6-18).

Claim 4/2/1: Brock-Fisher'732 teaches the ultrasonic probe driving section generates a first driving pulse of the object to be measured (Figure 4, Element 55 & Col.

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3, Line 53-55). Brock-Fisher'732 teaches a second driving pulse suited to determine a fluid portion (Col. 2, Line 18-22). Brock-Fisher'732 teaches a computing section with a signal obtained by phase-detecting (Figure 4, Element 64, Figure 4, Element 70 & Col. 4, Line 21-26 & 38-42). Brock-Fisher'732 fails to teach obtaining the deformation amounts and/or elastic moduli. However, Bonnefous'028 teaches obtaining the deformation (Col. 1, Line 45 – Col. 2, Line 5) or elastic moduli (Col. 3, Line 47-50). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Brock-Fisher'732 and Bonnefous'028 in order to perform various calculations and realize very useful representations (Col. 2, Line 15-17). Brock-Fisher'732 teaches the fluid determining section (Figure 4, Element 70) determines the fluid portion in accordance with a signal obtained by phase-detecting an ultrasonic reflected wave obtained by the second driving pulse (Col. 2, Line 18-22 & Col. 4, Line 28-33). Brock-Fisher'732 fails to teach a second driving pulse by the Doppler method. However, Bonnefous'028 teaches a second driving pulse by the Doppler method (Col. 8, Line 26-33). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Brock-Fisher'732 and Bonnefous'028 in order to broaden the use of the results and for the insensitivity to the dispersion of the ultrasonic wave used (Col. 8, Line 26-33).

Claim 5/1 and 6/1: Brock-Fisher'732 teaches an image data generating section for generating image data (Figure 4, Element 59 & 61 & Col. 5, Line 13-18). Brock-Fisher'732 fails to teach a two-dimensionally image- displaying the deformation amounts and/or elastic moduli. However, Bonnefous'028 teaches a two-dimensionally

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image- displaying the deformation amounts and/or elastic moduli of the object to be measured in a region other than the fluid portion by using the information determined by the fluid determining section (Col. 4, Line 40 – Col. 5, Line 4). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Brock-Fisher'732 and Bonnefous'028 in order to produce images for examination of the patient (Col. 4, Line 52-54). Although Brock-Fisher'732 and Bonnefous'028 do not cite using gradation display or chroma display by name, Brock-Fisher'732 and Bonnefous'028 do teach displays of functional equivalence (Brock-Fisher'732 Col. 4, Line 44-45 & 52-54 & Bonnefous'028 Figure 4, Element 61 & Col. 4, Line 45-48 & Col. 5, Line 13-18). Brock-Fisher'732 teaches a second image obtained by displaying the fluid portion with a predetermined color and displaying a region other than the fluid portion with colorless transparence (Col. 4, Line 45-48 & Col. 5, Line 13-18). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Brock-Fisher'732 and Bonnefous'028 in order to provide a means for review by the user (Brock-Fisher'732, Col. 5, Line 18). Brock-Fisher'732 fails to teach showing the deformation amounts and/or elastic moduli at positions. However, Bonnefous'028 teaches obtaining the deformation amounts (Col. 1, Line 45 – Col. 2, Line 5) and/or elastic moduli (Col. 3, Line 47-50) and forming a 2D image (Col. 4, Line 52). It would have been obvious to one of ordinary skill in the art to combine the teachings of Brock-Fisher'732 and Bonnefous'028 in order to produce images for examination of the patient (Col. 4, Line 52-54).

Claim 9/1: Brock-Fisher'732 teaches a display section for displaying an image (Figure 4, Element 61) in accordance with image data output from the image data generating section (Figure 4, Element 61).

6. Claim 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brock-Fisher'732 et al. (US Patent No. 6,398,732 B1), in view of Bonnefous'028 (US Patent No. 5,411,028) and further in view of Guracar'344 et al. (US Patent No. 6,030,344).

Claim 7/5/1: Brock-Fisher'732 and Bonnefous'028 fail to teach an envelope detecting section. However, Guracar'344 teaches envelop-detecting the ultrasonic reflected wave and an amplifying section for logarithm-amplifying an envelop-detected signal (Col. 8, Line 43-53). It would have been obvious to one of ordinary skill in the art to combine the teachings of Brock-Fisher'732, Bonnefous'028 and Guracar'344 in order to remove undesirable high frequency variations (Col. 8, Line 46-47). Brock-Fisher'732 teaches the image data generating section generates image data (Figure 4, Element 59). Brock-Fisher'732 and Bonnefous'028 fail to teach the image data obtained by synthesizing a B-mode image. However, Guracar'344 teaches image data obtained by B-mode imaging and other combination of images thereof (Col. 8, Line 11-27). It would have been obvious to one of ordinary skill in the art to combine the teachings of Brock-Fisher'732, Bonnefous'028 and Guracar'344 in order to provide user selection (Col. 8, Line 19).

Claim 8/7/5/1: Brock-Fisher'732 teaches the ultrasonic probe driving but Brock-Fisher'732 and Bonnefous'028 fail to teach fail to teach the generating a third driving pulse suited to generate a B-mode image and envelope-detecting section. However,

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Guracar'344 teaches using multiple imaging modes and thus other driving pulses for imaging (Col. 8, Line 14-18). It would have been obvious to one of ordinary skill in the art to combine the teachings of Brock-Fisher'732, Bonnefous'028 and Guracar'344 in order in order to provide user selection (Col. 8, Line 19). Guracar'344 teaches envelop-detecting the ultrasonic reflected wave and an amplifying section for logarithm-amplifying an envelop-detected signal (Col. 8, Line 43-53). It would have been obvious to one of ordinary skill in the art to combine the teachings of Brock-Fisher'732, Bonnefous'028 and Guracar'344 in order to remove undesirable high frequency variations (Col. 8, Line 46-47).

7. Claim 10-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brock-Fisher'732 et al. (US Patent No. 6,398,732 B1) and further in view of Bonnefous'028 (US Patent No. 5,411,028).

Claim 10: Brock-Fisher'732 teaches a control method of an ultrasonic diagnostic apparatus (Figure 4, Element 50 & Col. 3, Line 53). Brock-Fisher'732 teaches having a transmitting/receiving section for transmitting/receiving an ultrasonic wave (Figure 4, Element 55 & Col. 3, Line 53-55). Brock-Fisher'732 teaches a phase-detecting section for phase-detecting the received ultrasonic wave (Figure 4, Element 70 & Col. 4, Line 21-26 & 38-42). Brock-Fisher'732 teaches a computing section (Figure 4, Element 64) and the phase-detected ultrasonic wave (Figure 4, Element 70 & Col. 4, Line 21-26 & 38-42). Brock-Fisher'732 fails to teach for computing a deformation amount and/or elastic module. However, Bonnefous'028 teaches obtaining the elastic moduli (Col. 3, Line 47-50). It would have been obvious to one of ordinary

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skill in the art at the time of the invention to combine the teachings of Brock-Fisher'732 and Bonnefous'028 in order to perform various calculations and realize very useful representations (Col. 2, Line 15-17). Brock-Fisher'732 teaches the step of transmitting an ultrasonic wave to an object to be measured including a fluid portion in which fluid moves (Figure 4, Element 55 & Col. 3, Line 53-55) and receiving an ultrasonic reflected wave obtained when the ultrasonic wave reflects from the object to be measured (Figure 4, Element 55 & Col. 3, Line 61). Brock-Fisher'732 teaches the step of phase-detecting the ultrasonic reflected wave (Figure 4, Element 70 & Col. 4, Line 21-26 & 38-42). Brock-Fisher'732 teaches the step of a computing section (Figure 4, Element 64) and the phase-detected signal (Figure 4, Element 70 & Col. 4, Line 21-26 & 38-42). Brock-Fisher'732 fails to teach obtaining the velocities of the object to be measured at a plurality of measuring positions of the object to be measured and obtaining the deformation amounts and/or elastic moduli between measuring positions of the object to be measured from the velocities. However, Bonnefous'028 teaches obtaining velocities of the object to calculate deformation (Col. 1, Line 45 – Col. 2, Line 5) or elastic moduli (Col. 3, Line 47-50). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Brock-Fisher'732 and Bonnefous'028 in order to perform various calculations and realize very useful representations (Col. 2, Line 15-17). Brock-Fisher'732 teaches the step of determining a fluid portion in the object to be measured in accordance with the phase- detected signal (Col. 4, Line 38-48). Brock-Fisher'732 teaches the step of using information determined by the fluid determining section (Col. 5, Line 19-24). Brock-Fisher'732 fails to teach a two-

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dimensionally image- displaying the deformation amounts and/or elastic moduli.

However, Bonnefous'028 teaches a two-dimensionally image- displaying the deformation amounts and/or elastic moduli of the object to be measured in a region other than the fluid portion by using the information determined by the fluid determining section (Col. 4, Line 40 – Col. 5, Line 4). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Brock-Fisher'732 and Bonnefous'028 in order to produce images for examination of the patient (Col. 4, Line 52-54).

Claim 11/10: Brock-Fisher'732 teaches the fluid determining section (Col. 4, Line 38-48) but fails to teach a Doppler method. Bonnefous'028 teaches the Doppler method (Col. 8, Line 26-33). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Brock-Fisher'732 and Bonnefous'028 for the advantage of enabling broader use of the results and insensitive to the dispersion of the ultrasonic wave frequency used (Col. 8, Line 26-33).

Claim 12/11/10: Brock-Fisher'732 teaches a ultrasonic diagnostic apparatus control method of separating a frequency component higher than a predetermined value [threshold value] and a frequency component equal to or lower than the predetermined value [threshold value] from the phase-detected signal (Figure 4, Element 64 & 70, Figure 5, 112 & Col. 5, Line 6-18). Brock-Fisher'732 fails to teach obtaining the velocities of the object to be measured at a plurality of measuring positions of the object to be measured and obtaining the deformation amounts and/or elastic moduli between measuring positions of the object to be measured from the velocities. However,

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Bonnefous'028 teaches obtaining velocities of the object to calculate deformation (Col. 1, Line 45 – Col. 2, Line 5) or elastic moduli (Col. 3, Line 47-50). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Brock-Fisher'732 and Bonnefous'028 in order to perform various calculations and realize very useful representations (Col. 2, Line 15-17).

Claim 13/11/10: Brock-Fisher'732 teaches the ultrasonic probe driving section generates a first driving pulse for the object to be measured (Figure 4, Element 55 & Col. 3, Line 53-55). Brock-Fisher'732 fails to teach obtaining the deformation amounts and/or elastic moduli. However, Bonnefous'028 teaches obtaining the deformation (Col. 1, Line 45 – Col. 2, Line 5) or elastic moduli (Col. 3, Line 47-50). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Brock-Fisher'732 and Bonnefous'028 in order to perform various calculations and realize very useful representations (Col. 2, Line 15-17). Brock-Fisher'732 teaches a second driving pulse suited to determine a fluid portion (Col. 2, Line 18-22). Brock-Fisher'732 fails to teach the Doppler method transmitted to the object to be measured. Bonnefous'028 teaches the Doppler method (Col. 8, Line 26-33). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Brock-Fisher'732 and Bonnefous'028 for the advantage of enabling broader use of the results and insensitive to the dispersion of the ultrasonic wave frequency used (Col. 8, Line 26-33). Brock-Fisher'732 teaches a signal obtained by phase-detecting an ultrasonic reflected wave obtained from the first driving pulse (Col. 2, Line 18-22 & Col. 4, Line 28-33). Brock-Fisher'732 fails to teach obtaining

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the deformation amounts and/or elastic moduli. However, Bonnefous'028 teaches obtaining the deformation (Col. 1, Line 45 – Col. 2, Line 5) or elastic moduli (Col. 3, Line 47-50). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Brock-Fisher'732 and Bonnefous'028 in order to perform various calculations and realize very useful representations (Col. 2, Line 15-17). Brock-Fisher'732 teaches the fluid determining section (Figure 4, Element 70) determines the fluid portion in accordance with a signal obtained by phase-detecting an ultrasonic reflected wave obtained by the second driving pulse (Col. 2, Line 18-22 & Col. 4, Line 28-33).

Claim 14/10 & 15/10: Brock-Fisher'732 teaches the ultrasonic diagnostic apparatus control method for generating image data (Figure 4, Element 59 & 61 & Col. 5, Line 13-18). Brock-Fisher'732 fails to teach a two-dimensionally image- displaying the deformation amounts and/or elastic moduli. However, Bonnefous'028 teaches a two-dimensionally image- displaying the deformation amounts and/or elastic moduli of the object to be measured in a region other than the fluid portion by using the information determined by the fluid determining section (Col. 4, Line 40 – Col. 5, Line 4). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Brock-Fisher'732 and Bonnefous'028 in order to produce images for examination of the patient (Col. 4, Line 52-54). Although Brock-Fisher'732 and Bonnefous'028 do not cite using gradation display or chroma display by name, Brock-Fisher'732 and Bonnefous'028 do teach displays of functional equivalence (Brock-Fisher'732 Col. 4, Line 44-45 & 52-54 & Bonnefous'028 Figure 4, Element 61 &

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Col. 4, Line 45-48 & Col. 5, Line 13-18). Brock-Fisher'732 teaches a second image obtained by displaying the fluid portion with a predetermined color and displaying a region other than the fluid portion with colorless transparency (Col. 4, Line 45-48 & Col. 5, Line 13-18). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Brock-Fisher'732 and Bonnefous'028 in order to provide a means for review by the user (Brock-Fisher'732, Col. 5, Line 18). Brock-Fisher'732 fails to teach showing the deformation amounts and/or elastic moduli at positions. However, Bonnefous'028 teaches obtaining the deformation amounts (Col. 1, Line 45 – Col. 2, Line 5) and/or elastic moduli (Col. 3, Line 47-50) and forming a 2D image (Col. 4, Line 52). It would have been obvious to one of ordinary skill in the art to combine the teachings of Brock-Fisher'732 and Bonnefous'028 in order to produce images for examination of the patient (Col. 4, Line 52-54).

8. Claim 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brock-Fisher'732 et al. (US Patent No. 6,398,732 B1), in view of Bonnefous'028 (US Patent No. 5,411,028) and further in view of Guracar'344 et al. (US Patent No. 6,030,344).

Claim 16/14/10: Brock-Fisher'732 and Bonnefous'028 fail to teach envelope-detecting. However, Guracar'344 teaches envelop-detecting the ultrasonic reflected wave and an amplifying section for logarithm-amplifying an envelop-detected signal (Col. 8, Line 43-53). It would have been obvious to one of ordinary skill in the art to combine the teachings of Brock-Fisher'732, Bonnefous'028 and Guracar'344 in order to remove undesirable high frequency variations (Col. 8, Line 46-47). Brock-Fisher'732

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teaches generates image data (Figure 4, Element 59). Brock-Fisher'732 and Bonnefous'028 fail to teach the image data obtained by synthesizing a B-mode image. However, Guracar'344 teaches image data obtained by B-mode imaging and other combination of images thereof (Col. 8, Line 11-27). It would have been obvious to one of ordinary skill in the art to combine the teachings of Brock-Fisher'732, Bonnefous'028 and Guracar'344 in order to provide user selection (Col. 8, Line 19).

Claim 17/16/14/10: Brock-Fisher'732 teaches the ultrasonic probe driving but Brock-Fisher'732 and Bonnefous'028 fail to teach fail to teach the generating a third driving pulse suited to generate a B-mode image and envelope-detecting. However, Guracar'344 teaches using multiple imaging modes and thus other driving pulses for imaging (Col. 8, Line 14-18). It would have been obvious to one of ordinary skill in the art to combine the teachings of Brock-Fisher'732, Bonnefous'028 and Guracar'344 in order in order to provide user selection (Col. 8, Line 19). Guracar'344 teaches envelop-detecting the ultrasonic reflected wave and for logarithm-amplifying an envelop-detected signal (Col. 8, Line 43-53). It would have been obvious to one of ordinary skill in the art to combine the teachings of Brock-Fisher'732, Bonnefous'028 and Guracar'344 in order to remove undesirable high frequency variations (Col. 8, Line 46-47).

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- a. Herrington, David M. et al. Ultrasound Apparatus and Method for Tissue Characterization (US Patent No. 6,264,609 B1).

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- b. Ito, Masao et al. Intima-media Thickness Measuring Apparatus and Arterial Sclerosis Diagnosing System (US Patent No. 6,132,373 A).
- c. Mourad, Pierre D. et al. System and Method for Making Noninvasive Physiological Assessments (US Patent No. 6,875,176 B2).
- d. Pitsillides, Koullis F. et al. Method and Apparatus for Myocardial Wall Measurement (US Patent No. 5,544,656).
- e. Stein, James H. Ultrasonic apparatus and Method for Providing Quantitative Indication of Risk of Coronary Heart Disease (US Patent No. 6,730,035 B2).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Helene Brown whose telephone number is 571-272-2947. The examiner can normally be reached on M-F 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eleni Mantis-Mercader can be reached on 571-272-4740. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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